

CLAIMS

- 1 1. A method of cooling a low Z target material of a neutron source assembly, comprising the
2 step of:
3 circulating liquid gallium past the target material to cool the low Z target material.
- 1 2. The method of claim 1, wherein said step of circulating comprises the steps of:
2 providing a reservoir of liquid gallium; and
3 pumping the liquid gallium from the reservoir to the low Z target material to cool the target
4 material and through a heat exchanger to remove heat from the liquid gallium.
- 1 3. The method of claim 1, wherein said step of circulating comprises the step of providing
2 a flow of liquid gallium through a nozzle that establishes a jet of liquid gallium that impinges upon
3 the target.
- 1 4. The method of claim 2, wherein the target material comprises beryllium.
- 1 5. A neutron source assembly having a liquid cooled target, comprising:
2 a modulator/reflector assembly that includes a low Z target material that is bombarded by
3 accelerated particles to produce a neutron flux; and
4 a cooling system that circulates liquid gallium through said modulator/reflector assembly

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5 to cool the low Z target material.

1 6. The neutron source assembly of claim 5, wherein said cooling system comprises:
2 a reservoir of liquid gallium;
3 a heat exchanger in fluid connection with said reservoir of liquid gallium; and
4 means for circulating said liquid gallium between said reservoir of liquid gallium, said heat
5 exchanger and said modulator/reflector assembly.

1 7. The neutron source assembly of claim 6, wherein said means for circulating comprises a
2 pump.
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1 8. A liquid cooling system for a neutron source assembly, said cooling system comprising:
2 a reservoir of liquid gallium;
3 a heat exchanger in fluid connection with said reservoir of liquid gallium; and
4 means for circulating said liquid gallium between said reservoir of liquid gallium, said heat
5 exchanger and the neutron source assembly to remove heat from a neutron generating target
6 material within the neutron source assembly.